

SMALL BUSINESS TECHNOLOGY TRANSFER (STTR) PROGRAM SOLICITATION AND GUIDELINES

Closing Date: December 14, 1998

Nanotechnology Sensors for Harsh Environments

**NATIONAL SCIENCE FOUNDATION
NSF 98-153 (Replaces NSF 98-29)**

The National Science Foundation (NSF) funds research and education in most fields of science and engineering. Grantees are wholly responsible for conducting their project activities and preparing the results for publication. Thus, the Foundation does not assume responsibility for such findings or their interpretation.

NSF welcomes proposals from all qualified scientists, engineers and educators. The Foundation strongly encourages women, minorities, and persons with disabilities to compete fully in its programs. In accordance with federal statutes, regulations, and NSF policies, no person on grounds of race, color, age, sex, national origin, or disability shall be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving financial assistance from NSF (unless otherwise specified in the eligibility requirements for a particular program).

Facilitation Awards for Scientists and Engineers with Disabilities (FASSED) provide funding for special assistance or equipment to enable persons with disabilities (investigators and other staff, including student research assistants) to work on NSF-supported projects. See the program announcement or contact the program coordinator at (703) 306-1636.

The National Science Foundation has Telephonic Device for the Deaf (TDD) and Federal Information Relay Service (FIRS) capabilities that enable individuals with hearing impairments to communicate with the Foundation regarding NSF programs, employment, or general information. TDD may be accessed at (703) 306-0090 or through FIRS on 1-800-877-8339.

PRIVACY ACT AND PUBLIC BURDEN STATEMENTS

The information requested on proposal forms and project reports is solicited under the authority of the National Science Foundation Act of 1950, as amended. The information on proposal forms will be used in connection with the selection of qualified proposals; project reports submitted by awardees will be used for program evaluation and reporting within the Executive Branch and to Congress. The information requested may be disclosed to qualified reviewers and staff assistants as part of the review process; to applicant institutions/grantees to provide or obtain data regarding the proposal review process, award decisions, or the administration of awards; to government contractors, experts, volunteers and researchers and educators as necessary to complete assigned work; to other government agencies needing information as part of the review process or in order to coordinate programs; and to another Federal agency, court or party in a court or Federal administrative proceeding if the government is a party. Information about

Principal Investigators may be added to the Reviewer file and used to select potential candidates to serve as peer reviewers or advisory committee members. See Systems of Records, NSF-50, "Principal Investigator/Proposal File and Associated Records," 63 Federal Register 267 (January 5, 1998), and NSF-51, "Reviewer/Proposal File and Associated Records," 63 Federal Register 268 (January 5, 1998). Submission of the information is voluntary. Failure to provide full and complete information, however, may reduce the possibility of receiving an award.

Public reporting burden for this collection of information is estimated to average 120 hours per response, including the time for reviewing instructions. Send comments regarding this burden estimate and any other aspect of this collection of information, including suggestions for reducing this burden, to: Reports Clearance Officer; Information Dissemination Branch, DAS; National Science Foundation; Arlington, VA 22230.

YEAR 2000 REMINDER

In accordance with Important Notice No. 120 dated June 27, 1997, Subject: Year 2000 Computer Problem, NSF awardees are reminded of their responsibility to take appropriate actions to ensure that the NSF activity being supported is not adversely affected by the Year 2000 problem. Potentially affected items include: computer systems, databases, and equipment. The National Science Foundation should be notified if an awardee concludes that the Year 2000 will have a significant impact on its ability to carry out an NSF funded activity. Information concerning Year 2000 activities can be found on the NSF web site at <http://www.nsf.gov/oirm/y2k/start.htm>.

**NATIONAL SCIENCE FOUNDATION
SMALL BUSINESS TECHNOLOGY TRANSFER PROGRAM
PROPOSAL CHECKLIST**

Do not submit this checklist with your proposal.
DOES THE PROPOSAL MEET THE FOLLOWING REQUIREMENTS?
<ul style="list-style-type: none"> • Proposal is 25 pages or less and conforms to page size and type requirements--excluding NSF Form 1225 (Attachment A), Certification Page-Attachment B (side 2) and the Written Cooperative Agreement.
<ul style="list-style-type: none"> • COVER PAGE is complete--Attachment B.
<ul style="list-style-type: none"> • CERTIFICATION PAGE is signed by PI and research institution PI, and Authorized Institutional Representative (Attachment B, side 2).
<ul style="list-style-type: none"> • Project duration does not exceed 12 months.
<ul style="list-style-type: none"> • PROJECT SUMMARY is complete--Attachment C.
<ul style="list-style-type: none"> • Principal Investigator is primarily employed by this firm.
<ul style="list-style-type: none"> • Not less than 40 percent of the work will be performed by the small business concern, and not less than 30 percent of the work will be performed by the research institution.
<ul style="list-style-type: none"> • Written Cooperative Agreement will be completed and signed. (See Sec. 5.3 O.)
<ul style="list-style-type: none"> • Statement of current and pending support is included. If funding for overlapping or equivalent work has been requested or received, the box on the cover sheet is checked off and the proposal includes a statement discussing the status of the funding request.
<ul style="list-style-type: none"> • Proposal describes commercial potential.
<ul style="list-style-type: none"> • PROPOSAL BUDGET is on NSF 1030A (Attachment D), is for \$100,000 or less, and is signed by the PI and Institutional Representative. University budget is on Form 1030A and is signed by the Research Institution PI and university's Institutional Representative.
<ul style="list-style-type: none"> • Proposal budget excludes foreign travel and equipment purchase.
<ul style="list-style-type: none"> • Ten (10) copies (an original and 9 copies) of the proposal are submitted.
<ul style="list-style-type: none"> • Will meet deadline for receipt at the National Science Foundation: 5:00 p.m. EST, December 14, 1998.
<ul style="list-style-type: none"> • Proposer has read all instructions in this Solicitation.

NATIONAL SCIENCE FOUNDATION PROGRAM SOLICITATION FOR SMALL BUSINESS TECHNOLOGY TRANSFER (STTR)

The National Science Foundation (NSF), an independent agency of the Federal Government, invites small business concerns to submit proposals for innovative, commercially feasible, cooperative research with a nonprofit research institution partner under this Program Solicitation. STTR requires researchers at universities and other research institutions to play a significant intellectual role in the conduct of each STTR project. These university-based researchers, by joining forces with a small company, can spin off their commercially promising ideas while they remain primarily employed at the research institution.

1. PROGRAM DESCRIPTION

1.1 The Federal STTR Program

The STTR Program, currently in five Federal agencies, was established by the Small Business Technology Transfer Act of 1992 (Public Law 102-564, Title II). Under this program a small portion of a Federal Agency's extramural research and research and development (R/R&D) effort is reserved for awards to small business concerns and their nonprofit research institution partners for cooperative research and development efforts. For information on the other STTR programs, see website: <http://www.sba.gov/sbir/>.

1.2 The NSF STTR Program

The NSF STTR Program expands the public/private partnership to include joint venture opportunities for small businesses and the nation's premier nonprofit research institutions. NSF expects synergism in the proposed research. A team approach is required in which at least one research investigator is employed by the small business concern and at least one investigator is employed by the research institution. STTR combines the strengths of both entities by introducing entrepreneurial skills to high technology research efforts.

The STTR Program is not a substitute for existing unsolicited proposal mechanisms used in other NSF programs. Unsolicited proposals will not be accepted under the STTR Program in either Phase I or II. The proposed research must be responsive to the NSF program focus.

1.3 Program Emphasis for 1998

Proposals will be accepted in the areas of Nanotechnology and Sensors for Harsh Environments only. (See Section 11, Research Topic Description).

This solicitation is for Phase I proposals only.

1.4 Phase I--Concept Feasibility

In Phase I, the proposer shows the scientific, technical, and commercial merit and feasibility of the cooperative research effort.

The work proposed for Phase I should be a base for progression to Phases II and III. The ultimate objective of the research must be to develop commercializable products, processes, or techniques.

Under this solicitation NSF anticipates that it will make about 10-15 Phase I awards of up to \$100,000 each. Work under Phase I should be completed within 12 months.

1.5 Phase II--Concept Refinement

The objective of Phase II is to continue the research effort from Phase I. Only Phase I awardees are eligible to participate in Phase II. Phase II proposals may only be submitted to the Federal agency that awarded Phase I of the effort. Phase II awards have an expected period of performance of 24 months and the level of support usually will not exceed \$450,000 for the 24-month period. It is estimated that approximately one-third of the Phase I awardees will receive Phase II grants depending upon availability of funds.

1.6 Phase III--Commercial Applications

The objective of the third phase is to pursue commercial applications from the government-funded research in order to stimulate technological innovation and improve the return on investment from Federally-funded research for its economic and social benefits to the nation.

Phase III is to be conducted with non-STTR funds (either Federal or non-Federal). NSF will not fund Phase III efforts.

2. ELIGIBILITY

For both Phases I and II, the research conducted by the proposing small business concern and the research institution must be performed in the United States. "United States" means the 50 States, the territories and possessions of the United States, the Commonwealth of Puerto Rico, the Commonwealth of the Northern Mariana Islands, the Trust Territory of the Pacific Islands, and the District of Columbia.

2.1. Eligibility of Proposer: The Small Business Concern

Only a small business concern is eligible to submit a proposal for cooperative research with a research institution.

A proposing small business must qualify under the definition of small business given in Section 3.05 of this solicitation. Joint ventures and limited partnerships are eligible provided the entity qualifies as a small business as defined in this program solicitation.

2.2 Eligibility of Research Institution

The cooperating research institution must qualify as a research institution under the definition given in Section 3.09 of this solicitation. However, NSF does not normally support activities of those scientists and engineers employed by Federally Funded Research and Development

Centers.

2.3 Eligibility of the Principal Investigator and the Research Institution Investigator

The Principal Investigator (PI) must be primarily employed by the small business concern. Primary employment means that more than one-half of the Principal Investigator's time is spent in the employ of the small business concern. The individual who is proposed as the PI at the time of the submission of the Phase I proposal is expected to be the PI from the time of the inception of the Phase I award until its completion. A change in PI prior to an award could affect whether an award will be made.

The Research Institution Investigator must have a primary employment affiliation with the research institution. NSF will not normally make an award to a Small Business Concern where the Research Institution Investigator is an owner, officer or employee.

2.4 Management of the STTR Program

The small business concern must provide satisfactory evidence that it will exercise management, direction and control of the performance of the STTR funding agreement. Regardless of the proportion of the work or funding of each of the performers under an award, the small business concern is to be the grantee with overall responsibility for performance of the research project.

3. DEFINITIONS

The following definitions apply for the purposes of this solicitation:

3.01. Principal Investigator--The Code of Federal Regulations, Title 42, Part 52 defines a Principal Investigator as "the single individual designated by the grantee in a grant application...who is responsible for the scientific and technical direction of the project."

3.02. Research--Any activity which is a systematic, intensive study directed toward greater knowledge or understanding of the subject studied or a systematic study directed specifically toward applying new knowledge to meet a recognized need.

3.03. Development--A systematic application of knowledge toward the production of useful materials, devices, and systems or methods, including design, development, and improvement of prototypes and new processes to meet specific requirements.

3.04. Subcontract--Any agreement, other than one involving an employer-employee relationship, entered into by a Federal Government funding agreement awardee calling for supplies or services required solely for the performance of the original funding agreement.

3.05. Small Business--A business concern that at the time of award of Phase I and Phase II funding agreements meets the following criteria:

(1) Is independently owned and operated, is not dominant in the field of operation in which it is proposing, has its principal place of business located in the United States, and is organized for profit;

(2) Is at least 51 percent owned, or in the case of a publicly owned business, at least 51 percent

of its voting stock is owned by United States citizens, or lawfully admitted permanent resident aliens;

(3) Has, including its affiliates, *a number of employees not exceeding 500*, and meets the other regulatory requirements found in 13 CFR Part 121. Business concerns, other than investment companies licensed, or state development companies qualifying under the Small Business Investment Act of 1938, 15 U.S.C. 661, et seq., are affiliates of one another when either directly or indirectly, (a) one concern controls or has the power to control the other; or (b) third parties (or party) control(s) or have the power to control both. Control can be exercised through common ownership, common management, and contractual relationships. The term "affiliates" is defined in great detail in 13 CFR 121.3-2(a). The term "number of employees" is defined in 13 CFR 121.3-2(t). Business concerns include, but are not limited to, any individual, partnership, corporation, joint venture, association or cooperative.

3.06. Socially and Economically Disadvantaged Small Business--A socially and economically disadvantaged small business concern is one that is

(1) At least 51 percent owned by (i) an Indian tribe or a native Hawaiian organization, or (ii) one or more socially and economically disadvantaged individuals, and

(2) Whose management and daily business operations are controlled by one or more of such individuals.

A socially and economically disadvantaged individual is defined as a member of any of the following groups:

(1) Black Americans

(2) Hispanic Americans

(3) Native Americans

(4) Asian-Pacific Americans

(5) Subcontinent Asian Americans

(6) Other groups designated from time to time by SBA to be socially disadvantaged; or

(7) Any other individual found to be socially and economically disadvantaged by SBA pursuant to Section 8(a) of the Small Business Act, 15 U.S.C. 637(a).

3.07. Women-Owned Small Business--A small business that is at least 51 percent owned by a woman or women who also control and operate it. "Control" in this context means exercising the power to make policy decisions. "Operate" in this context means being actively involved in the day-to-day management.

3.08 Cooperative Research and Development--Research and development conducted jointly by a small business concern and a research institution in which not less than 40 percent of the work is performed by the small business concern, and not less than 30 percent of the work is performed by the research institution.

3.09 Research Institution--A research organization that is

(1) A nonprofit university, or

(2) A nonprofit research institution as defined in section 4(5) of the Stevenson-Wydler Technology Innovation Act of 1980, or

(3) A contractor-operated federally-funded research and development center, as identified by the National Science Foundation in accordance with the government-wide Federal Acquisition Regulation issued in accordance with section 35(c) (1) of the Office of Federal Procurement Policy Act (or any successor legislation thereto).

3.10 Technical Data--Data developed by the grantee during the performance of a Small Business Technology Transfer (STTR) grant, such as data relating to an invention or a manufacturing process or software developed under the grant.

3.11 Proprietary Information--Trade secrets or commercial or financial information submitted by a proposer or grantee that is privileged or confidential. Information is confidential if disclosure of the information is likely to cause substantial harm to the competitive position of the proposer or grantee.

3.12 Overlapping Work--Any steps in the performance of work on one proposal that would not need to be repeated to perform the work on the second proposal.

3.13 Overlapping Proposals--One proposal that involves the performance of work that overlaps with the work entailed by the second proposal.

3.14 Equivalent Proposals--One proposal that entails the performance of work that completely overlaps with the work entailed by the second proposal.

3.15 Consultant--Persons who are not employees of the small business concern or research institution named anywhere in the proposal as contributing to the research.

4. METHOD OF SELECTION AND EVALUATION CRITERIA

- Proposals will be screened to determine responsiveness to the specific requirements of the solicitation.
- Scientists and engineers in the field will then evaluate proposals passing this technical screen.
- Each proposal will be evaluated on its merits and judged on a competitive basis.
- NSF is under no obligation to fund any proposal or any specific number of proposals on a given topic.

4.1. Administrative Screening

NSF will review each proposal to determine if it satisfies all of the requirements described in Section 5, Proposal Preparation Instructions and Requirements.

- Nonresponsive proposals will be returned to the proposer without further consideration.

4.2. Merit Review

Academic and industrial scientists and engineers in the appropriate field will competitively evaluate responsive proposals in a process of external merit review. Most reviewers are located in universities and Government. Others may be employees of nonprofit research laboratories, recent retirees from industrial firms, and employees of industrial organizations.

In all instances, proposals will be handled on a confidential basis and care taken to avoid conflicts of interest. Evaluations will be confidential to NSF and to the proposed Principal Investigator, to the extent permitted by law.

In the Phase I merit review process, approximately equal consideration will be given to these two criteria:

Following each criterion are potential considerations that the reviewer may employ in the evaluation of STTR proposals.

(1) What is the merit of the proposed activity?

How well conceived is the proposed cooperative research activity? Is the cooperative research plan a sound approach for establishing the technical and commercial feasibility of the concept? How well qualified is the team (small business concern and university or other Federally funded research and development center) to conduct the STTR project? If appropriate, the reviewer will comment on the success of prior work to commercialize technology. To what extent does the proposed activity suggest and explore unique or ingenious concepts or applications? Is there sufficient access to resources?

(2) What are the broader impacts of the proposed activity?

What may be the commercial, societal or scientific research instrumentation benefits of the proposed activity? Can the proposed cooperative work lead to a marketable product or process? What is the likelihood that the project could attract further development funding after the STTR project ends? How well does the proposed activity broaden the participation of underrepresented groups (e.g., gender, ethnicity, disability, geographic, etc.)?

4.3. Selection for Award

NSF cannot support all the meritorious Phase I proposals that are recommended for funding. Evaluation scores, rankings, and comments from review panels and/or external reviewers are advisory to the National Science Foundation. Recommended proposals are then reviewed by the STTR program officer who considers the evaluations and comments from external reviewers as well as the past performance in the STTR and SBIR program, commercial potential, program balance, and other factors in making recommendations for awards.

4.4. Debriefing

When an award or declination is made, the PI receives:

- verbatim copies of reviews, excluding the names of the reviewers;
- summaries of review panel deliberations, if any;
- a description of the process by which the proposal was reviewed; and
- the context of the decision (such as the number of proposals and awards, and information about funding availability).

5. PROPOSAL PREPARATION INSTRUCTIONS AND REQUIREMENTS

5.1. Contact with NSF

Requests for copies of the solicitation may be addressed to: STTR Program Office, National Science Foundation, Room 590, 4201 Wilson Blvd., Arlington, VA 22230, telephone (703) 306-1390 or by e-mail to pubs@nsf.gov.

- **Questions about the NSF STTR Program** may be addressed to the STTR Program Manager at the above address.
- **Questions concerning the scientific and engineering aspects of the research topic** should be addressed to the cognizant Program Director listed under the topic description (See Section 11).
- The **solicitation may also be downloaded** onto a PC from the SBIR/STTR web page: <http://www.eng.nsf.gov/sbir/sttr>.

5.2. Proposal Preparation

Proposals not meeting these requirements will be returned without further consideration.

- Limit the Phase I proposal to a total of 25 consecutively numbered pages (single- or double-spaced) including Cover Page, Project Summary, main text, references, other enclosures or attachments (except those specifically excluded from the page count) and the Proposal Budgets. Use standard size pages. Metric size A4 (210 mm X 297 mm) is preferred. 8 1/2" x 11" (216 mm X 279 mm) may be used.
- Margins not less than 25 mm and type no smaller than 12-point font size must be used, except as legends on reduced drawings, but not tables).
- **Do not send in any supplementary materials, revisions, and substitutions.**
- When responding to this solicitation, use the metric system of weights and measures, unless impractical or inefficient.

A proposal must contain adequate information to be reviewed as research. NSF reserves the right not to submit to technical review any proposal which it finds to have insufficient scientific or technical information.

5.3. Phase I Proposal Format

- **The proposal should include all of the following items in the order shown.**
- NSF forms may be photocopied as required.
- One proposal must contain original signatures and should be clearly marked as the original.

A. NSF Form 1225 (Attachment A)--Attach this form to the cover page of the copy of the original proposal only.

- Provide information for both the Principal Investigator and the Research Institution Investigator.
- This form is not included in the page count for the proposal nor does it go to reviewers.

B. Cover Sheet (Attachment B)--Complete page 1 of this form and use it as page 1 of each proposal.

- Page 2 of this form--Certification Page--must be completed and fully signed. Attach this page to the original proposal only. The Certification Page is not included in the proposal page count.

1. The Phase I performance period is normally 12 months.

2. The title of the proposal should be brief, technically valid, intelligible to the non-scientist or engineer, and suitable for use in the public press. NSF may edit the title of the project before making an award.

C. Project Summary (Attachment C)--Use this Form as page 2 for all copies of each proposal. Under "Technical Abstract":

- identify the problem or opportunity and research objectives
- describe the research, anticipated results, and potential applications of the research
- complete the sections entitled Key Words and Potential Commercial Applications of the Research.
- be brief, technically valid, and intelligible to the non-scientist or engineer. In the event of an award, this information will be made public.

D. Identification and Significance of the Problem or Opportunity--Make a clear statement of the specific research problem or opportunity addressed and its importance. This section will begin page 3 of your proposal.

E. Background, Technical Approach, and Anticipated Benefits

- Describe the overall background and technical approach to the problem or opportunity and how the proposed research will provide the needed results.
- Highlight the innovativeness and originality of the research.

- State the anticipated results and potential commercial applications if the research is successful, including the significance of the research and its potential to: (1) provide the research base to attract follow-on investment for product or process development in Phase III; and (2) stimulate or achieve technological innovation.

F. Phase I Research Objectives--List and explain the specific objectives to be accomplished in the course of the Phase I research, including the questions it will try to answer which determine the technical feasibility of the proposed approach. Establish the connections with the Phase II research and Phase III efforts.

G. Phase I Research Plan--Describe the Phase I research plan in detail.

- Indicate not only what is planned but also how the research will be carried out.
- Include a technical discussion of the proposed concept, the methods planned to achieve each objective or task, and the sequence of experiments, tests and computations.
- Link the objectives and the questions that the Phase I research effort is designed to answer.
- **Specifically address the amount and type of work to be performed both by the small business concern and by the research institution and describe the necessary cooperation, coordination, and complementarity. List key personnel involved in the project and describe the programmatic and fiscal arrangements for the cooperative research.**

Scheduling and project staff activities charts may be useful. Such charts might include each task, scheduled completion dates, and decision points. Also, indicate which tasks are key starting points for Phase II work.

This is a key section and should be about one-third of the total proposal--8 or more pages.

H. Commercial Potential

- Describe the potential applications of the research results in the marketplace and the plans to market and commercialize the technology.
- Describe the current plan for commercializing the results of the research. This plan should include a brief description of the proposing company, its field of interest, and the commercial applications or market niche the STTR research is addressing.
- Briefly describe the major competitive products in those fields; any significant advantages the approach has over existing technology in application, performance, technique, efficiency or cost; and how the small business concern plans to move from research to market, as anticipated at this time.
- Proposing firms with prior NSF or other SBIR support should indicate the number of SBIR Phase I and Phase II awards that they have received and summarize their progress in commercializing that support.

Past performance in the commercialization of SBIR and STTR results is a consideration in award decisions.

I. Related Research-- Describe:

- significant and recent research directly related to the proposed effort,
- how it relates to the proposed research, and
- any planned coordination with outside sources.

Include a concise bibliography.

J. Principal Investigator, Research Institution Investigator, and Senior Personnel--Provide information on the Principal Investigator, the Research Institution Investigator, and other senior personnel from either the small business concern or the research institution which shows that they have the qualifications to undertake the cooperative research effort. The appropriateness and strength of the complementarity of the research team should be described.

The Principal Investigator and Senior Personnel must be employees of the small business. The Principal Investigator must be primarily employed by the small business concern. (See Sec. 2.3.)

Pages devoted to vitae are included within the 25-page limit on the proposal.

For administrative purposes, an investigator from the small business concern must be designated as the Principal Investigator.

K. Consultants and Subcontracts

1. Consultants-- Present information on the qualifications of the consultants, their education, experience, any directly relevant publications, and how their efforts will contribute to the proposal. Proposers should have in their own file evidence of the commitment of consultants to participate in the project.

In addition, provide a signed statement from each consultant, whether paid or unpaid, confirming his/her availability and time commitment, role in the project, and agreed consulting rate--not to exceed the daily rate paid to an Executive Schedule Level IV or equivalent, currently \$453/day--for participation in this project.

2. Subcontracts--Where a subcontract involves research other than at the cooperating research institution, the subcontractor should furnish a letter signed by an appropriate official describing the programmatic arrangements and confirming its agreed participation in the research along with its proposed budget on Form 1030A for this participation.

*See Note in Section P. Budget Section on Expenditure Breakdown and percentages of work.

L. Equipment, Instrumentation, Computers, and Facilities--Describe the necessary equipment, instrumentation, computers, and physical facilities to carry out the research and/or analytical efforts including its availability and location--at the small business concern, at the cooperating research institution, or elsewhere. Do not list equipment, instrumentation,

computers, and facilities that are not necessary to the proposed project.

M. Current and Pending Support of Principal Investigator, Research Institution Investigator, and Senior Personnel--Provide information about all research to which the Principal Investigator, the Research Institution Investigator, and other senior personnel have committed time for the period of performance under an STTR grant, whether or not salary for the person involved is included in the budgets of the various projects.

If none, report none.

Provide the following information:

- titles and dates of each current grant or contract and each pending grant or contract where, respectively time has been or will be committed;
- name of each granting or contracting organization;
- person-months devoted to each project by the Principal Investigator, the Research Institution Investigator, and each of the senior personnel during the proposed grant period;
- identical information for all proposed STTR research that is being considered by or that will be submitted in the near future to other possible sponsors; and
- identical information for all proposed research that is being considered by, or that will be submitted in the near future to, other NSF programs.

The current and pending support statement should be included in the proposal at the time of submission.

N. Equivalent or Overlapping Proposals to Other Federal Agencies --A proposal that contains the same or overlapping work can be sent to any other Federal agency. See Secs. 3.13 and 3.14. Where an equivalent or overlapping proposal has already been submitted, or where one will be submitted in the near future to another Federal agency, a statement must be included which provides the following information for each equivalent or overlapping proposal:

- The name and address of the agency to which the proposal was or will be submitted;
- Date of proposal submission;
- Title, number, and date of solicitation under which the proposal was submitted or will be submitted;
- The specific applicable research topics for each STTR proposal submitted;
- Titles of the proposal;
- Name and title of Principal Investigator (Project Manager).

NSF will not make awards that essentially duplicate research funded (or expected to be

funded) by other agencies. Receiving duplicate funding from Federal sources or from a Federal source and any other source for the same research, or essentially the same research, is fraudulent.

If no equivalent or overlapping proposals are under consideration, state none.

O. Written Cooperative Agreement-- Note: The Written Cooperative Agreement should be provided to NSF with the Phase I proposal. If the Agreement has not been signed at the time the proposal has been submitted, the negotiation process should be underway and a statement to that effect must be provided to NSF with the Phase I proposal. When an award is being considered, the signed Agreement must be provided to NSF upon request.

The Agreement between the small business concern and the research institution must cover the allocation of intellectual property rights and rights, if any, to carry out follow-on research, development, or commercialization.

A model agreement relating to these issues is provided in Section 12 of this solicitation. This model is for guidance only and may be modified by the parties. The Agreement must contain the signatures of an official of the small business concern and an appropriate official of the research institution.

By signing the proposal, the official of the small business concern certifies that the agreement negotiated with the research institution is satisfactory to the small business concern.

P. Budget--The NSF Summary Proposal Budget Form 1030A (Attachment D) Must Be Used.

In the STTR Program, research is to be conducted jointly by a small business concern and a nonprofit research institution. Not less than 40 percent of the work conducted under an STTR award must be performed by the small business concern, and not less than 30 percent of the work must be performed by the nonprofit research institution. That is, a minimum of 40 percent of the total budget must be allocated to the small business concern, and a minimum of 30 percent of the total budget must be allocated to the cooperating research institution.

- Complete a Form 1030A for the total budget. Phase I estimates must be shown in detail on this form. Funds for the research institution should be shown on G.5. --Subcontracts-- of the NSF Summary Proposal Budget.
- **Breakouts of the budgets for the small business concern and for the subcontract to the research institution must be provided on separate Form 1030As.** Proposers are encouraged to use photocopies of Attachment D for these breakouts.
- **Purchases of routine analytical or other routine services from commercial sources are not regarded as reportable subcontract activity.** For such activity no letter is required. The item-- routine analytical or other routine services--should be reported in the Budget (Attachment D) under Other Direct Costs/Other.

In the Summary Proposal Budget and in the breakout budget for the small business concern, the Principal Investigator and senior personnel employed by the small business concern should be listed by name with their time commitments budgeted in person-months and in dollar amount for

the period of performance. In the breakout budget for the subcontracting research institution, the Research Institution Investigator and senior personnel employed by the research institution should be listed by name with their time commitments budgeted in person-months and in dollar amount for the period of performance.

- The budget should reflect cost for work to be done only after the effective date of the award. Any costs incurred prior to the issuance of an award document are at the grantee's own risk.
- The reimbursement rates for consultants are a direct cost that cannot exceed the daily rate paid to a Level IV of the Executive Schedule or equivalent--currently \$453 per day. Consultant travel should be shown under the travel category.
- Equipment and foreign travel cannot be included in the Phase I budget. Equipment is defined as an article of non-expendable, tangible property, having a **useful life of more than one year and an acquisition cost of \$5,000 or more per unit.**
- The budget should indicate in general terms the categories of expendable materials and supplies required, with their estimated costs. **The breakdown should be more detailed when the costs shown on line G. 1. of NSF Budget Form 1030 exceed \$5,000.**
- The total budget on line L of Form 1030A (including a fee of up to 7%) must not exceed \$100,000 for the Phase I proposal.
- Reasonable fees (estimated profit) will be considered under both phases of the solicitation. The amount of the fee included in the proposed budget will not exceed 7 percent of total project costs. **Cost sharing is permitted; however, it is not required nor will it be a factor in the evaluation of a proposal.**
- The small firm and the research institution should submit separate copies of NSF Form 1030A. Each organization should have its own principal investigator and organizational representative sign Form 1030A.
- Budgets for travel funds must be justified and related to the needs of the project. Travel expenses for attendance at technical conferences are not permitted unless the conference directly relates to the project.
- Tuition costs are not considered research or research and development. Accordingly, they are not acceptable costs and should not be included in the budget. Graduate students should be paid as employees of the organization where they do their work.

5.4. Checklist--The Checklist, which appears as page iii, has been included for your convenience; it should not be submitted as part of your proposal.

6. SCHEDULE

6.1. Phase I

Proposal due at NSF by December 14, 1998

Notification by NSF of receipt of proposal by January 1999

Mail notification of awards and declinations June 1999

Estimated Phase I award effective date July 1999

Phase I Final Report due within 30 days after the end of the 12-month grant support/performance period

6.2. Phase II

Instructions from NSF for preparing Phase II proposals by January, 2000

Phase II Proposal Due at NSF by September, 2000

7. OTHER CONSIDERATIONS

7.1. Awards

NSF anticipates making about 10-15 Phase I fixed-price grants of up to \$100,000 each. Awards will be made normally for a twelve (12)-month period of performance.

Prior to any award, the Foundation may require certain organizational, management and financial information for administrative purposes to assure that the applicant adheres to certain business and financial standards. When requested by NSF, this information should be returned to the requesting office as expeditiously as possible.

7.2. Payment Schedule

No invoices are necessary under Phase I grants. Phase I payments will be made as follows: 40 percent approximately 3-4 weeks after the effective date of the award provided that a Request for Initial Payment and ACH Vendor/Miscellaneous Payment enrollment Form are received by the NSF Division of Financial Management, 40 percent six months after the award, and the remainder upon acceptance of a satisfactory Phase I Final Report by NSF.

7.3. Grantee Commitments

In the event of an award, the awardee will be required to make certain legal commitments through acceptance of the terms and conditions of the Phase I funding agreements. Copies of complete terms and conditions are available upon request.

7.4. Reports

Additional instructions will be sent to Phase I awardees before the scheduled completion of Phase I.

A. Phase I Final Report--Twelve (12) copies of a comprehensive Phase I Final Report not to exceed 30 pages in length, must be submitted to: STTR Program, National Science Foundation, 4201 Wilson Blvd., Room 590, Arlington VA 22230. The Phase I Final Report is due within 30 days after the end of the Phase I 12- month grant support/performance period (unless otherwise stated in the grant letter).

The final report shall include:

- a verbatim statement of Phase I objectives from the Phase I proposal,
- a summary description of the research carried out,
- the research findings or results, and
- the potential commercial applications of the research.

The balance of the report should then describe in detail these same topics as well as the problems addressed and estimates of technical feasibility.

The Phase I Final Report delivered under the grant, including technical data, may be made available to the public by the Government, except for that portion of the report containing technical data properly identified and marked as set forth in 7.5.B below. To the extent permitted by law, except for evaluation purposes, the Government will not release properly identified and marked technical data outside the Government without the approval of the grantee for a period of four years from the expiration of the Phase II grant or of the Phase I grant, when no Phase II award is made. The Phase I Final Report will be sent by NSF to the National Technical Information Service (NTIS) four years following expiration of the Phase II grant or four years from the expiration of the Phase I grant when no Phase II award is made.

All final reports must carry the following acknowledgment on the cover page: "This material is based upon work supported by the National Science Foundation under award number _____. Any opinions, findings, and conclusions or recommendations expressed in this publication are those of the author(s) and do not necessarily reflect the views of the National Science Foundation."

An acknowledgment of NSF support and disclaimer also must appear in publications of any materials, whether copyrighted or not, based on or developed under NSF-supported projects. The disclaimer may be deleted from any articles or papers published in scientific, technical or professional journals.

B. NSF Form 98A--Within 90 days after the expiration of a grant, the investigator is required to submit a Form 98A: National Science Foundation Final Project Report to the NSF STTR Program Officer. **Form 98A is distinct from, and not to be confused with, the Phase I Final Report.** NSF will send Form 98A along with a postage-paid self-addressed envelope to each Principal Investigator approximately 30 days prior to the expiration date of a grant. The Form 98A fulfills the second of the two reporting requirements for a Phase I grant. **A Phase II proposal cannot be processed until this form has been received from the grantee.**

7.5. Proprietary Information, Inventions, and Patents

Proposals may contain proprietary information. In addition, Phase II proposals and Final Reports delivered under a grant may also contain technical data developed under the grant. The grantee may have rights in these technical data.

A. Proprietary Information in Proposals--Information contained in unsuccessful proposals will remain the property of the proposer, but NSF will retain file copies of all proposals. Public

release of information in any proposal will be subject to existing statutory and regulatory requirements.

Proposers should limit proprietary information to that deemed essential for proper evaluation of the proposal. Proprietary information may be included in the body of the proposal or set apart from other text. Any proprietary information included in the body of the proposal must be clearly marked, by sentence or paragraph, as proprietary. Any proprietary information set apart from other text should be on a separate page, and keyed to the text by numbers. Confine it to those critical items that, if disclosed, could jeopardize the obtaining of foreign or domestic patents or could reveal trade secrets or commercial or other financial information that could jeopardize the competitive position of the proposers.

NSF may find proposals or reports that attempt to restrict dissemination of large amounts of information unacceptable.

Proprietary information submitted to NSF will be treated in confidence, to the extent permitted by law, if it is clearly identified, by sentence or paragraph in the proposal text, or on a separate page. **List the numbers of those pages containing proprietary information as indicated at the bottom of the Proposal Cover Page (Attachment B).**

Without assuming any liability for inadvertent disclosure, NSF will limit dissemination of properly marked information to its employees and, as necessary, for the evaluation of the proposal, to outside reviewers on a confidential basis.

Phase II may also contain technical data developed under the Phase I grant. The grantee must properly identify and mark such technical data as described directly below in Section 7.5.B.

Since Final Reports by the Principal Investigator will be made available to public (see Section 7.4.A above) such reports should contain no restrictive language purporting to limit their use, except for technical data described in Section 7.4.B.

B. Rights in Data Developed Under STTR--The grantee may retain rights in technical data, including software developed under the NSF grant, except that the Government shall have the right to use such data for Governmental purposes. The Final Report delivered under the grant, including technical data, may be made available to the public by the Government except for that portion of the report containing technical data properly identified and marked as set forth below.

To the extent permitted by law, the Government will not release properly identified and marked technical data, such as data relating to an invention or software, outside the Government except for evaluation purposes for a period of four years from the expiration of the Phase II grant or of the Phase I grant, when no Phase II award is made, without approval of the grantee. **The grantee must properly identify such data and set it off on a separate page keyed to the text by numbers** in any submission to the Foundation. Such data must be clearly labeled as proprietary and marked with a legend similar to the following:

"The following is proprietary information which (name of grantee) requests not be released to persons outside the Government except for purposes of evaluation, for a period of four years from the expiration of Grant No. _____ or, if a follow-on Phase II grant is awarded, whichever is later."

In addition to the rights vested in the Government to use such technical data during the four-year period mentioned above, the Government shall retain a royalty free, irrevocable, world-wide license to use the data after the conclusion of the four-year period whether or not the grantee has sought or obtained patent protection or claimed copyright protection.

7.6. Copyrights

The grantee normally may copyright and publish (consistent with appropriate security considerations, if any) material developed with NSF support. NSF receives a royalty-free license for the Federal Government and requires that each publication contains an acknowledgment and disclaimer statement as shown in Section 7.4., Reports.

7.7. Patents

Each award agreement will contain a patent rights clause under which small business firms normally retain the principal worldwide patent rights to any invention made with NSF support. NSF receives a royalty-free license for Federal Government use, reserves the right to require the patent holder to license others in certain circumstances, and requires that anyone exclusively licensed to sell the invention in the United States must normally manufacture it domestically. To the extent authorized by 35 U.S.C. 205, NSF will not make public any disclosure by the grantee of a NSF-supported invention for a four-year period to allow the grantee a reasonable time to file a patent application. The time period for filing is specified in the patent rights clause and applicable Federal regulations. Additional information may be obtained from the Office of the General Counsel, Room 1265, National Science Foundation, Arlington, VA 22230.

7.8. Additional Critical Information

--Management Responsibility. The performance of the Principal Investigator and other employees or consultants who carry out the proposed work is to be managed by the small business concern receiving an STTR award.

--Accuracy of Information. The proposing organization, the Principal Investigator and the Authorized Organizational Representative are responsible for the accuracy and validity of all the administrative, fiscal, and scientific information in the proposal.

Deliberate withholding, falsification, or misrepresentation of information could result in administrative actions such as declination of a proposal or the suspension and/or termination of an award, as well as possible criminal penalties.

--Audits. Phase I and Phase II awards are subject to Federal audit as specified in the applicable Grant Terms and Conditions.

--Changes in Principal Investigator, Organization, or Research Institution Investigator Status. Any changes of the PI or Research Institution Investigator must be requested in writing 30 days prior to when the awardee wants the change to become effective (except in extraordinary circumstances, such as the death of the PI) and must be approved in writing by the Grants Officer. These changes must be acceptable to the STTR program and then can be approved in writing by the NSF Grants Officer. Address all requests to STTR Program Manager, Room 590, National Science Foundation, 4201 Wilson Boulevard, Arlington, VA 22230.

--The STTR Program must be notified promptly if there is any change in the name or address of the business concern, if the concern no longer qualifies as a small business, or if the Research Institution Investigator changes. Significant changes in the financial capability or structure of the awardee small business concern that could have a material effect on the awardee's performance under the award must also be reported.

--**This Program Solicitation is Intended for Informational Purposes and Reflects Current Planning.** If there is any inconsistency between the information contained herein and the terms of any resulting STTR grant, the terms of the grant are controlling.

8. SUBMISSION OF PROPOSALS

8.1. Deadline for Proposals

Deadline for receipt (10 copies) at the National Science Foundation is **5:00 p.m., EST, December 14, 1998**. Proposals which do not meet the deadline or that do not adhere to other requirements of this solicitation will be returned to the proposer without further consideration.

Evaluation and processing will require about four (4) months for completion.

No information on proposal status will be available until formal notification is made (approximately June 1999).

8.2 Proposal Submission

Proposals (10 copies) should be addressed to:
Proposal Processing Unit, Room P1-60
NSF Solicitation No. 98-29
4201 Wilson Blvd.
Arlington VA 22230
ATTN: STTR

A. Packaging--Secure packaging is mandatory. The Foundation cannot be responsible for the processing of proposals damaged in transit. All 10 copies of a proposal shall be sent in the same package. Do not send separate "information" copies or several packages containing parts of a single proposal. The Principal Investigator and the corporate official must sign one copy as an original. The other copies of the proposal need only contain copies of the original signatures.

B. Bindings and Covers--**Do not use any special binding or cover.** Staple the pages in the upper left-hand corner of the cover sheet of each proposal.

9. PHASE II

9.1. Eligibility

Only those NSF Phase I grantees who successfully complete their awards and submit acceptable Phase I Final Reports are eligible to submit Phase II proposals to NSF. Instructions for submittal of Phase II proposals will be provided to all Phase I awardees.

All Phase II awards are contingent on the availability of STTR funds. The budget request and

period of performance in Phase II should depend upon the scope of research proposed, but will not normally exceed 24 months and \$450,000.

It is estimated that approximately one-third of the Phase I awardees will receive Phase II grants depending upon availability of funds.

9.2. Phase II Criteria

In evaluation of Phase II proposals, approximately equal consideration will be given to the following criteria:

Following each criterion are potential considerations that the reviewer may employ in the evaluation of STTR proposals.

(1) What is the merit of the proposed activity?

Degree to which the Phase I objectives were met (from Phase I Final Report). How well conceived is the proposed cooperative research activity? Is the Phase II cooperative research plan a sound approach for attaining a laboratory prototype or equivalent for Phase III product development and commercialization? How well qualified is the team (small business concern and university or other Federally funded research and development center) to conduct the STTR project? If appropriate, the reviewer will comment on the success of prior work to commercialize technology. To what extent does the proposed activity suggest and explore unique or ingenious concepts or applications? Is there sufficient access to resources?

(2) What are the broader impacts of the proposed activity?

What may be the commercial, societal or scientific research instrumentation benefits of the proposed activity? Can the proposed cooperative work lead to a marketable product or process? What is the potential of the proposed concept for commercial applications as evidenced by: (a) the small business's record of commercializing research; (b) the existence of acceptable second-phase funding commitments from private sector or non-STTR funding sources; (c) the existence of acceptable third-phase follow-on funding commitments for the subject of the research, and; (d) the presence of other indicators of commercial potential of the idea. How well does the proposed activity broaden the participation of underrepresented groups (e.g., gender, ethnicity, disability, geographic, etc.)?

In the case of proposals of otherwise approximately equal merit, the provision of the Phase III follow-on funding commitments will be an important consideration.

Resubmission of a declined Phase II proposal is not permitted.

9.3 Annual Commercialization Report

Phase II awardees are required to provide an annual commercialization report over the award period, and they may be asked to continue reporting commercial results for five years after the award period. The report would include the amount and type of continuing investment obtained to pursue commercialization and any products, sales, royalties, patents or spin-offs attributable to the STTR project. The purpose of this report is to help monitor the extent of commercial application derived from STTR-supported research. The STTR Program Manager will provide

specific instructions.

10. SCIENTIFIC AND TECHNICAL INFORMATION SOURCES

Proposers may want to obtain scientific and technical information related to their proposed effort as background or for other purposes. Literature searches, abstracts, publications, and the names of potential consultants in the specific research area may be obtained at good technical libraries, some state organizations, and also from the organizations listed below. Documents should be ordered soon after receipt of a solicitation as it may take some time to acquire them. To obtain this service or additional information, contact any of the following organizations.

National Technology Transfer Center (NTTC)
316 Washington Avenue
Duvall Center
Wheeling, WV 26003
1-800-678-6882

National Technical Information Service
5285 Port Royal Road
Springfield, VA 22161
(703) 487-4600
1-800-553-6847

NASA Technology Transfer Centers:

Center for Technology Commercialization, Inc.
Massachusetts Technology Park
100 North Drive
Westborough, MA 01581
(508) 870-0042

Great Lakes Industrial Technology Center
Battelle Memorial Institute
25000 Great Northern Corporate Center, Suite 260
Cleveland, OH 44070-5310
(216) 734-0094

The Mid-Atlantic Technology Applications Center
823 William Pitt Union
University of Pittsburgh
Pittsburgh, PA 15260
1-800-257-2725

NASA Far West Regional Technology Transfer Center
3716 S. Hope Street, Suite 200
Los Angeles, CA 90007
CA Only (800) 642-2872
Others: 1-800-872-7477

NASA Mid-Continent Technology Transfer Center
Texas A & M University System
237 Wisenbaker Engineering Research Center
College Station, TX 77843-8000
(409) 845-8762
1-800-472-6785

NASA/Southern Technology Applications Center
University of Florida
College of Engineering
1 Progress Boulevard, Box 24
Alachua, FL 32615
1-800-472-6785

NERAC
1 Technology Drive
Tolland, CT 06084
(203) 872-7000

Knight-Ridder Information
1-800-334-2564

Chemical Abstract Service
STN International
1-800-753-4227

11. RESEARCH TOPIC DESCRIPTIONS

1. NANOTECHNOLOGY

The focus of this solicitation topic is on technology that arises from the exploitation of physical, chemical and biological properties of systems that are intermediate in size between isolated atoms/molecules and bulk materials (1-100 nm), where phenomena length scales become comparable to the size of the structure. The development of new experimental, modeling and simulation tools at the "nano" scale provides fresh opportunities for scientific and technological developments in nanoparticles, nanostructured materials and nanodevices.

This solicitation topic encourages interactive small firm-university team approaches to innovative development in order to generate electronic, chemical and optical devices, creation of bio-templates and sensors, "smart" materials and films, self-assembly techniques, and fabrication techniques for nanostructured materials, nanocomponents and nanodevices with unusual properties. Areas of emphasis include:

- Synthesis/fabrication of nanostructures (1-100 nm) with tailored properties to be used for building up functional nanostructures.
- Processing/conversion of molecules and nano-precursors into functional nanostructures, nanostructured materials, nanocomponents and nanodevices, including sensors.

- Physical, mathematical, chemical and biological modeling and simulation techniques in the nanoscale range (about 1-100 nm).
- Development of instrumentation based on new principles for probing properties and phenomena not well understood at the nanometer scale.

We seek step-changes in advancing nanotechnology development, not small incremental improvements. Preference will be given to proposals that address real user needs with products, processes or devices that users are likely to accept.

Prospective applicants are encouraged to discuss the appropriateness of their proposal, prior to submission, with the Division of Chemical and Transport Systems contact: Dr. Mike Roco, (703) 306-1370 or e-mail: mroco@nsf.gov. Questions related to the STTR Program should be directed to: Darryl Gorman, STTR Program Manager, (703) 306-1391 or e-mail: dgorman@nsf.gov.

2. SENSORS FOR HARSH ENVIRONMENTS

There is a variety of unavoidable harsh environment engineering applications for sensors. Real-time monitoring and control of important key parameters is often crucial in such environments. These harsh environments include extreme physical conditions, such as high-temperature, high-pressure, corrosion, toxicity, electromagnetic interference and high-energy radiation. Conventional sensors may not perform adequately in such environments. This topic provides an opportunity for innovative small firm-university teams to produce commercially feasible products, processes and devices that perform well under the stresses of harsh environmental conditions. Areas of emphasis include:

- new sensing mechanisms for harsh environment applications;
- mechanical, optical and optoelectronic components that are resistant to harsh environmental conditions;
- advanced sensor packaging techniques;
- sensor instrumentation systems;
- high-temperature resistant electronic components and circuitry;
- extreme physical condition simulators for sensor testing.

We seek step changes in advancing sensor development, not small incremental advances. Preference will be given to proposals that address real user needs with products processes or devices that real users are likely to accept.

Prospective applicants are encouraged to discuss the appropriateness of their proposal, prior to submission, with the Division of Electrical and Communications Systems contact: Dr. Usha Varshney, (703) 306-1339 or e-mail: uvarshne@nsf.gov. Questions related to the STTR Program should be directed to: Darryl Gorman, STTR Program Manager, (703) 306-1391 or e-mail: dgorman@nsf.gov

12. MODEL AGREEMENT

MODEL AGREEMENT SMALL BUSINESS TECHNOLOGY TRANSFER (STTR) PROGRAM ALLOCATION OF RIGHTS IN INTELLECTUAL PROPERTY AND RIGHTS TO CARRY OUT FOLLOW-ON RESEARCH, DEVELOPMENT, OR COMMERCIALIZATION

This Agreement between

_____, a small business
concern organized as a _____ under the laws of
_____ and having a principal place of business
at _____, ("SBC") and
_____, a research institution
having a principal place of business at _____, ("RI")
is entered into for the purpose of allocating between the parties certain rights relating to an STTR
project to be carried out by SBC and RI (hereinafter referred to as the "PARTIES") under an
STTR funding agreement that may be awarded by the National Science Foundation (NSF) to
SBC to fund a proposal entitled " _____"
_____ "submitted, or to be submitted, to NSF
by SBC on or about _____, 199__.

1. Applicability of this Agreement.

(a) This Agreement shall be applicable only to matters relating to the STTR project referred to in the preamble above.

(b) If a funding agreement for an STTR project is awarded to an SBC based upon the STTR proposal referred to in the preamble above, SBC will promptly provide a copy of such funding agreement to RI, and SBC will make a subaward to RI in accordance with the funding agreement, the proposal, and this Agreement. If the terms of such funding agreement appear to be inconsistent with the provisions of this Agreement, the Parties will attempt in good faith to resolve any such inconsistencies. However, if such resolution is not achieved within a reasonable period, SBC shall not be obligated to award nor RI to accept the subaward. If a subaward is made by SBC and accepted by RI, this Agreement shall not be applicable to contradict the terms of such subaward or of the funding agreement awarded by NSF to SBC except on the grounds of fraud, misrepresentation, or mistake, but shall be considered to resolve ambiguities in the terms of the subaward.

(c) The provisions of this Agreement shall apply to any and all consultants, subcontractors, independent contractors, or other individuals employed by SBC or RI for the purposes of this STTR project.

2. Background Intellectual Property.

(a) "Background Intellectual Property" means property and the legal right therein of either or

both parties developed before or independent of this Agreement including inventions, patent applications, patents, copyrights, trademarks, mask works, trade secrets and any information embodying proprietary data such as technical data and computer software.

(b) This Agreement shall not be construed as implying that either party hereto shall have the right to use Background Intellectual Property of the other in connection with this STTR project except as otherwise provided hereunder.

(1) The following Background Intellectual Property of SBC may be used nonexclusively and, except as noted, without compensation by RI in connection with research or development activities for this STTR project (if "none" so state): _____

_____;

(2) The following Background Intellectual Property of RI may be used nonexclusively and, except as noted, without compensation by SBC in connection with research or development activities for this STTR project (if "none" so state):

_____;

(3) The following Background Intellectual Property of RI may be used by SBC nonexclusively in connection with commercialization of the results of this STTR project, to the extent that such use is reasonably necessary for practical, efficient and competitive commercialization of such results but not for commercialization independent of the commercialization of such results upon the condition that SBC pay to RI, in addition to any other royalty including any royalty specified in the following list, a royalty of __% of net sales or leases made by or under the authority of SBC of any product or service that embodies, or the manufacture or normal use of which entails the use of, all or any part of such Background Intellectual Property (if "none" so state):

_____.

3. Project Intellectual Property.

(a) "Project Intellectual Property" means the legal rights relating to inventions (including Subject Inventions as defined in 37 CFR § 401), patent applications, patents, copyrights, trademarks, mask works, trade secrets and any other legally protectable information, including computer software, first made or generated during the performance of this STTR Agreement.

(b) Except as otherwise provided herein, ownership of Project Intellectual Property shall vest in the party whose personnel conceived the subject matter or first actually reduced the subject matter to practice, and such party may perfect legal protection therein in its own name and at its own expense. Jointly made or generated Project Intellectual Property shall be jointly owned by the Parties unless otherwise agreed in writing. The SBC shall have the first option to perfect the rights in jointly made or generated Project Intellectual Property unless otherwise agreed in writing.

(1) The ownership, including rights to any revenues and profits, resulting from any product, process, or other innovation or invention based on the cooperative shall be allocated between the SBC and the RI as follows:

SBC Percent: _____ RI Percent:

(2) Expenses and other liabilities associated with the development and marketing of any product, process, or other innovation or invention shall be allocated as follows: the SBC will be responsible for ___ percent and the RI will be responsible for ___ percent.

(c) The Parties agree to disclose to each other, in writing, each and every Subject Invention, which may be patentable or otherwise protectable under the United States patent laws in Title 35, United States Code. The Parties acknowledge that they will disclose Subject Inventions to each other and the awarding agency within _____ months after their respective inventor(s) first disclose the invention in writing to the person(s) responsible for patent matters of the disclosing Party. All written disclosures of such inventions shall contain sufficient detail of the invention, identification of any statutory bars, and shall be marked confidential, in accordance with 35 U.S.C. §205.

(d) Each party hereto may use Project Intellectual Property of the other nonexclusively and without compensation in connection with research or development activities for this STTR project, including inclusion in STTR project reports to the NSF and proposals to the NSF for continued funding of this STTR project through additional phases.

(e) In addition to the Government's rights under the Patent Rights clause of 37 CFR § 401.14, the Parties agree that the Government shall have an irrevocable, royalty free, nonexclusive license for any governmental purpose in any Project Intellectual Property.

(f) SBC will have an option to commercialize the Project Intellectual Property of RI, subject to any rights of the Government therein, as follows--

1) Where Project Intellectual Property of RI is a potentially patentable invention, SBC will have an exclusive option for a license to such invention, for an initial option period of ___ months after such invention has been reported to SBC. SBC may, at its election and subject to the patent expense reimbursement provisions of this section, extend such option for an additional ___ months by giving written notice of such election to RI prior to the expiration of the initial option period. During the period of such option following notice by SBC of election to extend, RI will pursue and maintain any patent protection for the invention requested in writing by SBC and, except with the written consent of SBC or upon the failure of SBC to reimburse patenting expenses as required under this section, will not voluntarily discontinue the pursuit and maintenance of any United States patent protection for the invention initiated by RI or of any patent protection requested by SBC. For any invention for which SBC gives notice of its election to extend the option, SBC will, within ___ days after invoice, reimburse RI for the expenses incurred by RI prior to expiration or termination of the option period in pursuing and maintaining (i) any United States patent protection initiated by RI and (ii) any patent protection requested by SBC. SBC may terminate such option at will by giving written notice to RI, in which case further accrual of reimbursable patenting expenses hereunder, other than prior commitments not practically revocable, will cease upon RI's receipt of such notice. At any time prior to the expiration or termination of an option, SBC may exercise such option by giving written notice to RI, whereupon the parties will promptly and in good faith enter into negotiations for a license under RI's patent rights in the invention for SBC to make, use and/or sell products and/or services that embody, or the development, manufacture and/or use of which involves

employment of the invention. The terms of such license will include: (i) payment of reasonable royalties to RI on sales of products or services which embody, or the development, manufacture or use of which involves employment of, the invention; (ii) reimbursement by SBC of expenses incurred by RI in seeking and maintaining patent protection for the invention in countries covered by the license (which reimbursement, as well as any such patent expenses incurred directly by SBC with RI's authorization, insofar as deriving from RI's interest in such invention, may be offset in full against up to of accrued royalties in excess of any minimum royalties due RI); and, in the case of an exclusive license, (iii) reasonable commercialization milestones and/or minimum royalties.

(2) Where Project Intellectual Property of RI is other than a potentially patentable invention, SBC will have an exclusive option for a license, for an option period extending until months following completion of RI's performance of that phase of this STTR project in which such Project Intellectual Property of RI was developed by RI. SBC may exercise such option by giving written notice to RI, whereupon the parties will promptly and in good faith enter into negotiations for a license under RI's interest in the subject matter for SBC to make, use and/or sell products or services which embody, or the development, manufacture and/or use of which involve employment of, such Project Intellectual Property of RI. The terms of such license will include: (i) payment of reasonable royalties to RI on sales of products or services that embody, or the development, manufacture or use of which involves employment of, the Project Intellectual Property of RI and, in the case of an exclusive license, (ii) reasonable commercialization milestones and/or minimum royalties.

(3) Where more than one royalty might otherwise be due in respect of any unit of product or service under a license pursuant to this Agreement, the parties shall in good faith negotiate to ameliorate any effect thereof that would threaten the commercial viability of the affected products or services by providing in such license(s) for a reasonable discount or cap on total royalties due in respect of any such unit.

4. Follow-on Research or Development.

All follow-on work, including any licenses, contracts, subcontracts, sublicenses or arrangements of any type, shall contain appropriate provisions to implement the Project Intellectual Property rights provisions of this agreement and insure that the Parties and the Government obtain and retain such rights granted herein in all future resulting research, development, or commercialization work.

5. Confidentiality/Publication.

(a) Background Intellectual Property and Project Intellectual Property of a party, as well as other proprietary or confidential information of a party, disclosed by that party to the other in connection with this STTR project shall be received and held in confidence by the receiving party and, except with the consent of the disclosing party or as permitted under this Agreement, neither used by the receiving party nor disclosed by the receiving party to others, provided that the receiving party has notice that such information is regarded by the disclosing party as proprietary or confidential. However, these confidentiality obligations shall not apply to use or disclosure by the receiving party after such information is or becomes known to the public without breach of this provision or is or becomes known to the receiving party from a source

reasonably believed to be independent of the disclosing party or is developed by or for the receiving party independently of its disclosure by the disclosing party.

(b) Subject to the terms of paragraph (a) above, either party may publish its results from this STTR project. However, the publishing party will negotiate the right of refusal with the other party with respect to a proposed publication, as well as a day period in which to review proposed publications and submit comments, which will be given full consideration before publication. Furthermore, upon request of the reviewing party, publication will be deferred for up to additional days for preparation and filing of a patent application which the reviewing party has the right to file or to have filed at its request by the publishing party.

6. Liability.

(a) Each party disclaims all warranties running to the other or through the other to third parties, whether express or implied, including without limitation warranties of merchantability, fitness for a particular purpose, and freedom from infringement, as to any information, result, design, prototype, product or process deriving directly or indirectly and in whole or part from such party in connection with this STTR project.

(b) SBC will indemnify and hold harmless RI with regard to any claims arising in connection with commercialization of the results of this STTR project by or under the authority of SBC. The PARTIES will indemnify and hold harmless the Government with regard to any claims arising in connection with commercialization of the results of this STTR project.

7. Termination.

(a) This agreement may be terminated by either Party upon ____ days written notice to the other Party. This agreement may also be terminated by either Party in the event of the failure of the other Party to comply with the terms of this agreement.

(b) In the event of termination by either Party, each Party shall be responsible for its share of the costs incurred through the effective date of termination, as well as its share of the costs incurred after the effective date of termination, and which are related to the termination. The confidentiality, use, and/or non-disclosure obligations of this agreement shall survive any termination of this agreement.

AGREED TO AND ACCEPTED--

Small Business Concern

By: _____ Date: _____

Print name: _____

Title: _____

Research Institution

By: _____ Date: _____

Print name: _____

Title: _____

NSF 98-153

(Replaces NSF 98-29)

OMB #3145-0058

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